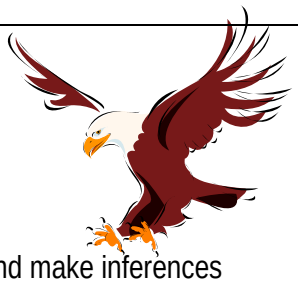

# *Flying High with Fledglings*

Overview:
Students will create a graph of the number of nests and fledglings of bald eagles in Virginia and make inferences on the reasons behind the growth curve.

SOL Objectives:
Math 7.18, 8.3, 8.12, 8.14
Science 6.1, 6.9, LS.1, LS.7, LS.11, LS.12

Background:

The bald eagle became our national symbol in 1782. As our national symbol, it holds a special place in the hearts of our citizens. Even though the bald eagle has been protected from direct harm by people since the Bald Eagle Protection Act of 1940, its habitat was not protected. By the 1960's the eagle population began to seriously decline until 1967, when it was placed on the U.S. Endangered Species List. A major cause of decline was DDT poisoning, a pesticide that caused the shells of the eggs to be thin and the embryos to develop improperly. The use of DDT in the United States was banned in 1972. The eagle was removed from the endangered species list on July 28, 2007.

The Endangered Species Act provided protection of any eagle's nest site and surrounding habitat. In 1977, the Virginia Department of Game and Inland Fisheries, (DGIF) began tracking the number of nests and the number of young fledged. Eagles lay 1 to 3 eggs each year during their reproductive life. Since eagles begin nesting in late winter, biologists are able to fly over the nests and count the number of young before the leaves appear on the trees. Later in the year, boat trips counted the number of juvenile and adult birds along Virginia's tidal rivers. The data table below shows the number of nests and the number of young fledged.

The table that follows shows a recovering population of eagles. The population will begin to level off once the carrying capacity is reached. Carrying capacity is the number of individuals that a given ecosystem can support during the year. Several limiting factors determine the number of eagles an area can support, including the availability of large trees capable of supporting nests, the distance to a river or other source of food, and the frequency of disturbance by outside factors such as boats or people walking near the nest site. Mated pairs tend to be territorial around their nests and will defend their nest site from other birds. They will continue to use the same nest year after year, adding more sticks each winter until the nest may weigh close to 100 pounds.

Eagles will congregate in feeding areas along the rivers and other areas where there is a plentiful food source. The sudden availability of a food source such as a fish kill or other carrion can be detrimental to the population if that food source is contaminated by pesticides or another poison. Eagles are capable of flying long distances during any given day; or an area may host a large number of birds one week and a small number the following week. The ability to travel long distances to a food source may cause a sudden decrease in the population along a river or in a region.

Problem:
Graph the increase in the number and nests and the number of fledglings over the past 27 years. Determine if there is a relationship between the number of eagle fledglings and improved environmental conditions. Did the number of eagles increase with the banning of the pesticide DDT in 1972? What other factors may have contributed to the number of eagles nesting in Virginia?

Data table

Eagle Nest's and Fledglings by Year

| Date | Year | Active Nests | Young Fledged |
|---|---|---|---|
| 1977 | 1 | 31 | 18 |
| 1978 | 2 | 36 | 18 |
| 1979 | 3 | 34 | 20 |
| 1980 | 4 | 35 | 35 |
| 1981 | 5 | 39 | 40 |
| 1982 | 6 | 45 | 40 |
| 1983 | 7 | 52 | 51 |
| 1984 | 8 | 60 | 57 |
| 1985 | 9 | 65 | 84 |
| 1986 | 10 | 66 | 83 |
| 1987 | 11 | 73 | 107 |
| 1988 | 12 | 80 | 118 |
| 1989 | 13 | 92 | 88 |
| 1990 | 14 | 104 | 142 |
| 1991 | 15 | 110 | 153 |
| 1992 | 16 | 131 | 141 |
| 1993 | 17 | 149 | 172 |
| 1994 | 18 | 144 | 158 |
| 1995 | 19 | 154 | 223 |
| 1996 | 20 | 180 | 243 |
| 1997 | 21 | 214 | 321 |
| 1998 | 22 | 229 | 314 |
| 1999 | 23 | 230 | 326 |
| 2000 | 24 | 270 | 414 |
| 2001 | 25 | 312 | 465 |
| 2002 | 26 | 329 | 501 |
| 2003 | 27 | 371 | 454 |
| 2004 | 28 | 401 | 612 |
| 2005 | 29 | 429 | 657 |
| 2006 | 30 | 469 | 709 |
| 2007 | 31 | 560 | 737 |

Analysis Questions

1. Looking at your graph, what inferences can you make about the relationship between the number of young and environmental conditions?
2. What are factors that would affect the population? (Hint: A goal of banning DDT and the protection of nest sites and surrounding habitat was to increase the eagle population, was this successful?)
3. Will the population continue to increase indefinitely? Why or why not?

For additional Math activities using actual Department of Game and Inland Fisheries wildlife data visit: http://www.dgif.virginia.gov/education